Appendix - Normalisation of Pearson Densities

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October 8, 2015

```
library(DiffusionRgqd)
GQD.remove()
```

```
## [1] "Removed :  NA "
```

```
G0 <- function(t){2*(10+sin(2*pi*(t-0.5)))}
G1 <- function(t){-2}
Q1 <- function(t){0.25*(1+0.75*(sin(4*pi*t)))}

states <- seq(5,15,1/10)
initial <- 8
Tmax <- 5
Tstart <- 1
increment <- 1/100

M <- GQD.density(Xs=initial,Xt=states,s=Tstart,t=Tmax,delt=increment)
```

```
##
##  ================================================================
##                    Generalized Quadratic Diffusion (GQD)
##  ================================================================
##  ______________________ Drift Coefficients ________________________
##  G0 : 2*(10+sin(2*pi*(t-0.5)))
##  G1 : -2
##  G2
##  ____________________ Diffusion Coefficients _____________________
##  Q0
##  Q1 : 0.25*(1+0.75*(sin(4*pi*t)))
##  Q2
##  ___________________ Distribution Approximant ____________________
##  Density approx. : Saddlepoint
##  P               :
##  alpha           :
##  Trunc. Order    : 4
##  Dens.  Order    : 4
## ================================================================
```

```
M1 <- GQD.density(Xs=initial,Xt=states,s=Tstart,t=Tmax,delt=increment,
Dtype='Normal', P = 100,alpha=1,lower = 1,upper = 20)
```

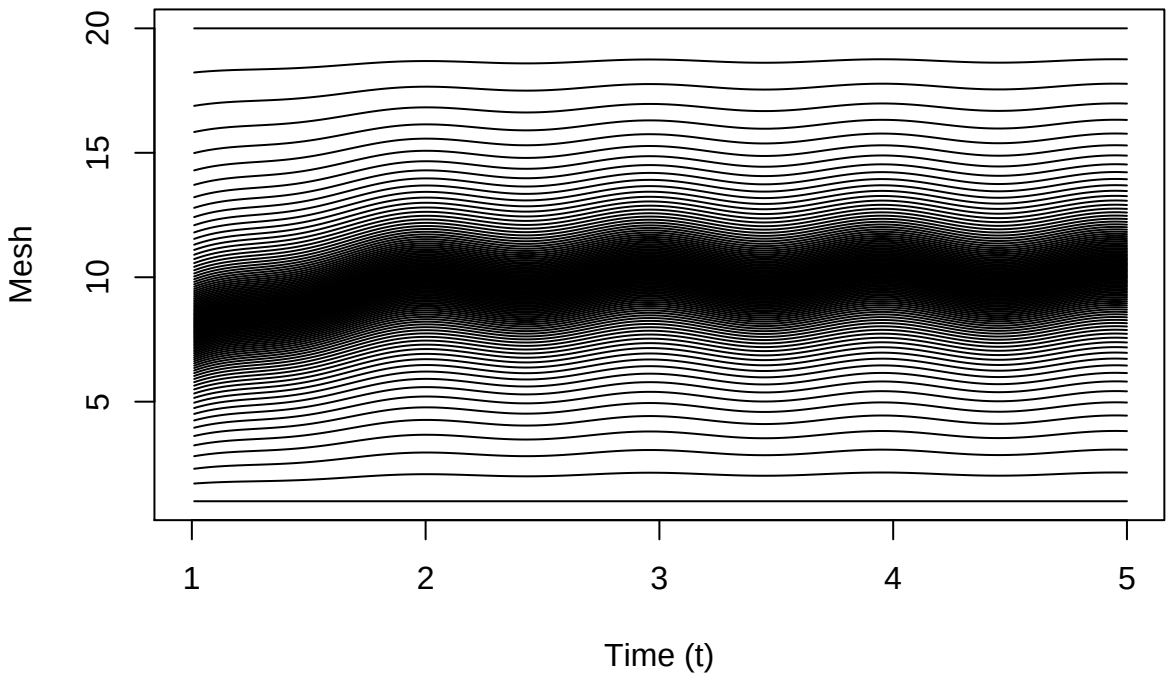
```
##
##  ================================================================
##                    Generalized Quadratic Diffusion (GQD)
##  ================================================================
##  ______________________ Drift Coefficients ________________________
```

```
##  G0 : 2*(10+sin(2*pi*(t-0.5)))
##  G1 : -2
##  G2
##  ____________________ Diffusion Coefficients _____________________
##  Q0
##  Q1 : 0.25*(1+0.75*(sin(4*pi*t)))
##  Q2
##  ___________________ Distribution Approximant ____________________
##  Density approx. : Normal
##  P               : 100
##  alpha           : 1
##  Trunc. Order    : 4
##  Dens.  Order    : 4
## ===================================================================
```

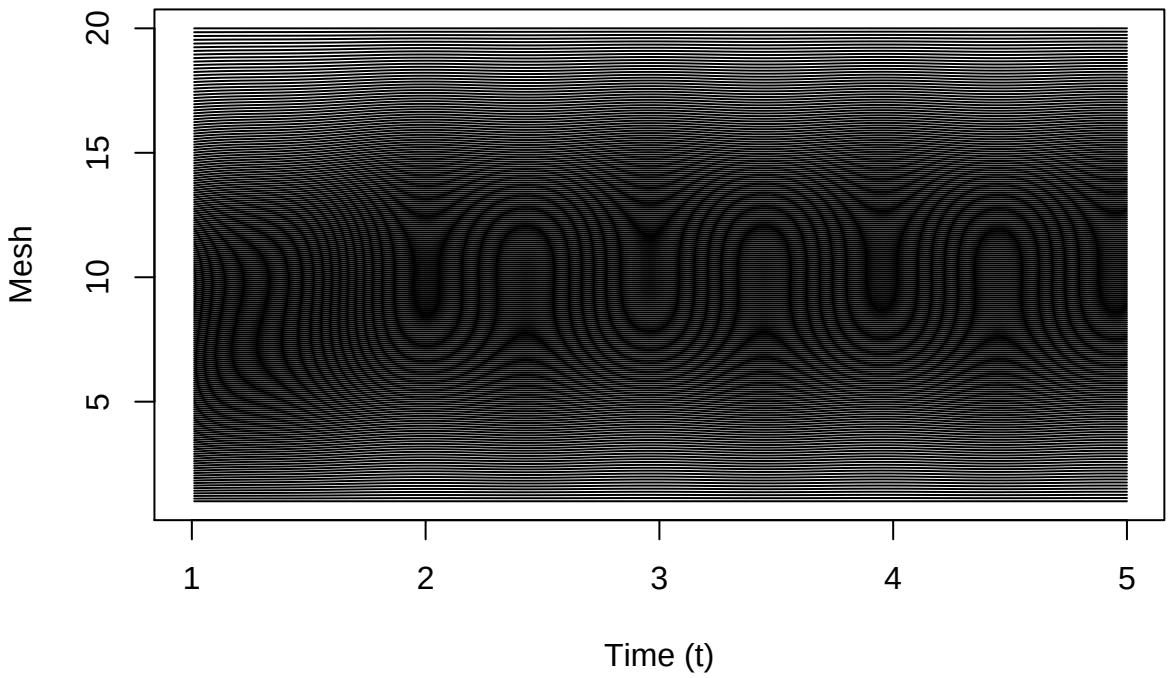
```
# Normalization regime no. 2:
M2 <- GQD.density(Xs=initial,Xt=states,s=Tstart,t=Tmax,delt=increment,
Dtype='Normal', P = 200,alpha=3,lower = 1,upper = 20)
```

```
##
##  ===================================================================
##                   Generalized Quadratic Diffusion (GQD)
##  ===================================================================
##  ______________________ Drift Coefficients ________________________
##  G0 : 2*(10+sin(2*pi*(t-0.5)))
##  G1 : -2
##  G2
##  ____________________ Diffusion Coefficients _____________________
##  Q0
##  Q1 : 0.25*(1+0.75*(sin(4*pi*t)))
##  Q2
##  ___________________ Distribution Approximant ____________________
##  Density approx. : Normal
##  P               : 200
##  alpha           : 3
##  Trunc. Order    : 4
##  Dens.  Order    : 4
## ===================================================================
```

```
plot(1,1,type= 'n',xlim=c(1,5),ylim=c(1,20),xlab='Time (t)',ylab = 'Mesh')
for(i in 1:100)
{
lines(M1$mesh[i,]~M1$time)
}
```




```
plot(1,1,type= 'n',xlim=c(1,5),ylim=c(1,20),xlab='Time (t)',ylab = 'Mesh')
for(i in 1:200)
{
lines(M2$mesh[i,]~M1$time)
}
```


Mesh
5
10
15
20
1
2
3
4
5
Time (t)